CLAIMS

1. A detecting data processing apparatus operable to determine whether one or more code words of a predetermined set of code words is present in a suspected version of a material item, the apparatus comprising

a registration processor operable to associate samples of the suspected version with samples of a copy of the original material item,

a recovery processor operable to generate a recovered code word by comparing the registered copy of the original and the suspect material items, and

a detection processor operable to detect one or more code words from a correlation between the recovered code word and the code words from the set, wherein the registration processor is operable to form at least one reduced-bandwidth-version of the material item and to associate the suspected version and the copy of the material item in accordance with a comparison between the reduced-bandwidth-versions of the suspected version and the original material item.

2. A detecting data processing apparatus as claimed in Claim 1, wherein the registration processor is operable to generate a plurality of reduced-bandwidth-versions of the suspected and of the copy of the original material items in accordance with a plurality of levels, each level corresponding to an increasing reduction in the bandwidth of the suspected and of the original material items, the association of the suspected version and of the copy of the original version being determined in accordance with a nested alignment process.

3. A detecting data processing apparatus as claimed in Claim 1, wherein the registration processor is operable to associate the suspected version and the original version according to the nested alignment process by

comparing reduced-bandwidth-versions of the suspected and of the original material items according to a lowest level having the smallest bandwidth,

determining any misalignment between the reduced-bandwidth-versions of the suspected and of the original material items according to the lowest level,

aligning the reduced-bandwidth-versions of the suspected and of the original material items according to next lowest level, and

repeating for the next lowest level until the suspected version and the original version of the material item are aligned.

4. A detecting data processing apparatus as claimed in Claim 1, wherein the reduced-bandwidth-versions of the suspected version and the copy of the original material item are formed by a bandwidth adaptation processor, the bandwidth reduction being formed in at least one of the spatial or the temporal domains.

5. A detecting data processing apparatus as claimed in Claim 1, wherein the suspected version is assumed to have been formed by combining a code word with part of the bandwidth of the original material item, the detecting data processing apparatus including a bandwidth adaptation processor operable in combination with the recovery processor to form reduced-bandwidth-versions of the suspected version or of the original versions of the material items, or of a difference between the suspected and the original material items, the registration processor being operable in combination with the bandwidth adaptation processor to perform the association as part of the bandwidth reduction.

6. A detecting data processing apparatus as claimed in Claim 5, wherein the code word has been introduced into at least one of the temporal or spatial bandwidth of the suspect material item and correspondingly the bandwidth adaptation processor is operable to perform the bandwidth reduction at least one of temporally or spatially.

7. A detecting data processing apparatus as claimed in Claim 5, wherein the bandwidth adaptation processor is operable to form reduced bandwidth versions of the suspected and of the original material items by spatially sub-sampling the suspected and the original versions of the material, the registration processor comprising a temporal alignment processor and a spatial alignment processor, the temporal alignment processor being operable to temporally align the spatially reduced-

bandwidth-version of the suspected and of the original copy of the material item, and the spatial alignment processor is operable to perform the nested alignment process, the plurality of reduced-bandwidth-versions being formed spatially for the nested alignment process.

8. A detecting data processing apparatus as claimed in Claim 1, wherein the correlation processor includes a code word generator operable to generate pseudo-random numbers from which the regenerated code word coefficients are formed, the pseudo-random numbers being generated from a seed value uniquely associated with the code word.

9. A detecting data processing apparatus as claimed in Claim 8, wherein the seed value is formed from the samples of the marked material item.

10. A detecting data processing apparatus as claimed in Claim 1, wherein the code word has been introduced into the material item in the discrete cosine transform domain, the apparatus comprising

a discrete cosine transform processor operable to transform the suspected reduced-bandwidth-version of the material item and the reduced-bandwidth-copy of the original material item into the discrete cosine transform domain, wherein the recovery processor is operable to generate the recovered code word by subtracting corresponding discrete cosine transform coefficients of the original material version from discrete cosine transform coefficients of the marked material version.

11. A method of determining whether one or more code words of a predetermined set of code words is present in a suspected version of a material item, the method comprising

associating samples of the suspected version with samples of a copy of the original material item,

generating a recovered code word by comparing the registered copy of the original and of the suspect material items, and

detecting one or more code words from a correlation between the recovered code word and the code words from the set, wherein the associating the samples of the suspected and original versions comprises

forming at least one reduced-bandwidth-version of the suspected version and of the original version of the material item, and

associating the suspected version and the copy of the material item in accordance with a comparison between the reduced-bandwidth-versions of the suspected version and of the original material item.

12. A method of determining as claimed in Claim 11, wherein the forming the at least one reduced-bandwidth-version of the suspected and of the original version comprises

generating a plurality of reduced-bandwidth-versions of the suspected and the copy of the original material items in accordance with a plurality of levels, each level corresponding to an increasing reduction in the bandwidth of the suspected and original material items, wherein the association of the suspected version and of the copy of the original version is determined in accordance with a nested alignment process.

13. A method of determining as claimed in Claim 12, wherein the association of the suspected version and the original version in accordance with the nested alignment process comprises

comparing reduced-bandwidth-versions of the suspected and of the original material items according to the lowest level having the smallest bandwidth,

determining any misalignment between the reduced-bandwidth-versions of the suspected and of the original material items according to the lowest level,

aligning the reduced-bandwidth-versions of the suspected and of the original material items according to next lowest level, and

repeating for the next lowest level until the suspected version and the original version of the material item are aligned.

14. A computer program providing computer executable instructions, which when loaded onto a data processor configures the data processor to operate as a detecting data processing apparatus according to Claim 1.

15. A computer program providing computer executable instructions, which when loaded on to a data processor causes the data processor to perform the method according to Claim 11.

16. A computer program product having a computer readable medium having recorded thereon information signals representative of the computer program claimed in Claim 14.

17. An apparatus for determining whether one or more code words of a predetermined set of code words is present in a suspected version of a material item, the apparatus comprising

means for associating samples of the suspected version with samples of a copy of the original material item,

means for generating a recovered code word by comparing the registered copy of the original and of the suspect material items, and

means for detecting one or more code words from a correlation between the recovered code word and the code words from the set, wherein the means for associating the samples of the suspected and original versions comprises

means for forming at least one reduced-bandwidth-version of the suspected version and of the original version of the material item, and

means for associating the suspected version and the copy of the material item in accordance with a comparison between the reduced-bandwidth-versions of the suspected version and of the original material item.

18. An apparatus for determining as claimed in Claim 17, wherein the means for forming the at least one reduced-bandwidth-version of the suspected and of the original version comprises

means for generating a plurality of reduced-bandwidth-versions of the suspected and the copy of the original material items in accordance with a plurality of levels, each level corresponding to an increasing reduction in the bandwidth of the suspected and original material items, wherein the association of the suspected version and of the copy of the original version is determined in accordance with a nested alignment process.

19. An apparatus for determining as claimed in Claim 18, wherein the means for associating the suspected version and the original version in accordance with the nested alignment process comprises

means for comparing reduced-bandwidth-versions of the suspected and of the original material items according to the lowest level having the smallest bandwidth,

means for determining any misalignment between the reduced-bandwidth-versions of the suspected and of the original material items according to the lowest level,

means for aligning the reduced-bandwidth-versions of the suspected and of the original material items according to next lowest level, and

means for repeating for the next lowest level until the suspected version and the original version of the material item are aligned.